

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:
Yong Zhang et al.

Examiner:

Serial No. 09/990,598

Art Unit: 2881

Filed: 11/20/2001

For: PORTABLE LOW-POWER
GAS DISCHARGE LASER

INFORMATION DISCLOSURE STATEMENT

Box DD
Honorable Commissioner for Patents
Washington, D.C. 20231

Sir:

The following U.S. patents are submitted under 35 CFR 1.97 as references the Examiner may wish to consider in connection with the examination of this application.

<u>U.S. Patent</u>	<u>Patentee</u>	<u>Date</u>
5,748,663	Chenousky	05/05/1998
5,065,405	Laakmann et al.	11/12/1991
4,719,639	Tulip	01/12/1988
4,596,018	Gruber et al.	06/17/1986
4,589,114	Sutter, Jr.	05/13/1986
4,169,251	Laakmann	09/25/1979

CLAIMS OF THE PRESENT INVENTION

The claims of the present invention are directed to a gas discharge laser, methods of constructing a gas discharge laser, and methods of stabilizing a gas discharge laser. The laser

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comprises an enclosure in which laser gas is contained and in which a pair of elongated electrodes are mounted with a discharge area between the electrodes in which laser discharge occurs, the enclosure having a first end with an opening and a second end opposite the first end with an attached mirror, the mirror being located near one end of the discharge area;

a support located outside of the enclosure and attached to the enclosure near the second end, the support having a flange proximate the first end of the enclosure extending inwardly toward the opening in the first end of the enclosure;

a cap disposed between the flange and the first end of the enclosure, the cap having an aperture covered with an attached output coupler located near another end of the discharge area opposite the mirror, the cap being movable relative to the flange and the first end of the enclosure;

a flexible seal between the first end of the enclosure and the cap; and

at least one adjustment device connected to the flange and contacting the cap to adjustably position the cap so as to align the output coupler with the mirror for optimum performance of the laser, the flexible seal accommodating adjustment of the cap without compromising integrity of the seal.

Several claims further recite mechanical details of the laser. In one embodiment the enclosure has an interior divided into two portions by the electrodes mounted opposite each other therein. The electrodes are in contact with the laser gas, and the laser gas is contained in the portions of the interior of the enclosure to provide a gas ballast for the laser. In another embodiment, the enclosure contains a discharge tube disposed between the electrodes and made of low loss dielectric material. The laser discharge occurs in the discharge tube. The electrodes are external to the discharge tube and not in physical contact with the laser discharge they generate. The output coupler is sealed to the discharge tube with a flexible elastomeric seal.

Other claims recite methods of constructing a gas discharge laser so that the laser discharge occurs in a tube and the electrodes are not in physical contact with the laser discharge, and sealing the output coupler to the discharge tube with a flexible elastomeric seal.

Still other claims recite methods of stabilizing a short cavity gas discharge laser through adjustment of a highly-reflective output coupler.

DISCUSSION OF THE LISTED REFERENCES

The Chenousky Laakmann, and Tulip patents are cited and discussed in the present specification. The Laakmann et al. patent is cited as an example of a gas-discharge laser in which the enclosure has an interior divided into portions by the electrodes mounted opposite each other therein. The electrodes are in contact with the laser gas, and the laser gas is contained in the portions of the interior of the enclosure to provide a gas ballast for the laser. However, Laakmann et al. does not disclose the structures of the present invention.

Gruber et al. and Sutter, Jr. are cited for their disclosure of external electrodes with gas lasers. Both disclose use of external electrodes with a dielectric tube, but the tube is a large bore, for a non-waveguide type laser. Gruber disclosed a waveguide made of a single solid homogeneous block of dielectric material with a small diameter bore made in it suitable to function as a waveguide. There are also grooves made in the outside of the block to which the electrodes are directly formed by known metalizing processes.

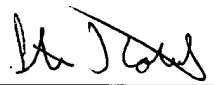
Gruber is also cited for its disclosure of adjustment of the laser mirrors, and use of a metal bellows to facilitate the adjustment, but Gruber does not disclose the use of an elastomeric seal, and specifically teaches away from the use of organic materials to provide the required vacuum seal integrity.

None of the above patents disclose the structures or methods of the present invention as claimed by the applicant. None of these patents anticipate the applicant's claims, nor do any of the patents in combination make the applicant's invention obvious.

The claims of this application distinguish over the cited references, and allowance and passage to issue of this application is therefore requested.

Respectfully submitted,
Yong Zhang et al.

by



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DISCLOSURE
APPLICANT

Complete if Known

Application Number	09/990,598
Filing Date	11/20/2001
First Named Inventor	ZHANG, Yong
Group Art Unit	2881
Examiner Name	
Attorney Docket Number	ZHA-101

Sheet	1	of	1
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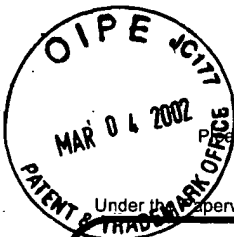
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¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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<h1>TRANSMITTAL FORM</h1> <p>(to be used for all correspondence after initial filing)</p>		Application Number	09/990,598	
		Filing Date	11/20/2001	
		First Named Inventor	ZHANG, Yong	
		Group Art Unit	2881	
		Examiner Name		
Total Number of Pages in This Submission		8	Attorney Docket Number	ZHA-101

ENCLOSURES (check all that apply)

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